

Background Info

Every person has their own unique pattern of fingerprints. This fact has long been used by police in identifying suspects. However, all patterns fit into one of three main types: **whorl**, **loop**, or **arch**.



1. Name the print that is homozygous dominant _____
2. Name the print that is homozygous recessive _____
3. Name the print that is heterozygous _____

Incomplete Dominance

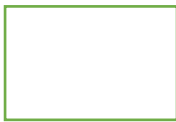
The three major fingerprint groups represent an example of **incomplete dominance**. Incomplete dominance occurs when neither the dominant nor recessive alleles. A heterozygous trait creates an intermediate phenotype. The dominant gene does not cover up the recessive gene, but instead their traits blend together.

4. Name the pattern that is a result of incomplete dominance?

Experiment

You will now determine your genotype and phenotype for your finger print.

1. Take a piece of tape, about 2 inches long
2. Rub a pencil in the square. The idea is to make a dark mark on the paper
3. Rub your left index finger on the dark spot
4. Place a strip of tape on your finger, sticky side facing the skin
5. Place your tape in the space below

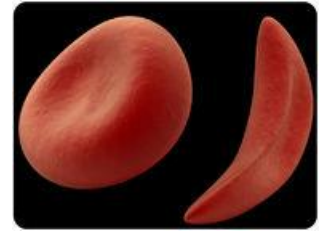


Answer the following questions based on your fingerprint results:

1. Phenotype of print: **whorl, loop, or arch** _____
2. Genotype of print: LL, Ll, or ll _____
3. Homozygous dominant, homozygous recessive, or heterozygous: _____
4. Is your print a result of incomplete dominance? _____

Exceptions to Mendel's Rules

In all of Mendel's experiments, he worked with traits where a single gene controlled the trait. Each also had one allele that was always dominant over the recessive allele. But this is not always true. There are exceptions to Mendel's rules, and these exceptions usually have something to do with the dominant allele.



Incomplete Dominance

One allele is NOT always completely dominant over another allele. Sometimes an individual has a phenotype between the two parents because one allele is not dominant over another. This pattern of inheritance is called **incomplete dominance**. For example, snapdragon flowers show incomplete dominance. One of the genes for flower **color** in snapdragons has two alleles, one for red flowers and one for white flowers.

A plant that is homozygous for the red allele (RR) will have red flowers, while a plant that is homozygous for the white allele will have white flowers (WW). But the heterozygote will have pink flowers (RW). Neither the red nor the white allele is dominant, so the phenotype of the offspring is a blend of the two parents.

Another example of incomplete dominance is sickle cell anemia, a disease in which a blood produced incorrectly. This causes the red blood cells to have a sickle shape, making it difficult for these misshapen cells to pass through the smallest **blood vessels**. A person that is homozygous recessive (ss) for the sickle cell trait will have red blood cells that all have the incorrect hemoglobin. A person who is homozygous dominant (SS) will have normal red blood cells.

What type of blood cells do you think a person who is heterozygous (Ss) for the trait will have? They will have some misshapen cells and some normal cells. Both the dominant and recessive alleles are expressed, so the result is a phenotype that is a combination of the recessive and dominant traits.